

# Description

## Bungee Carousel

### **CROSS REFERENCE TO RELATED APPLICATIONS**

[0001] Not Applicable.

### **FEDERAL RESEARCH STATEMENT**

[0002] Not Applicable.

### **BACKGROUND OF INVENTION**

### **FIELD OF THE INVENTION**

[0003] This invention relates to a support and storage apparatus for maintaining elastic fastening devices, such as bungee cords, of various lengths on a frame that may or may not rotate about an axis to provide visual identification of available storage devices and access to the desired device.

[0004] Typically such elastic fastening devices have means for attaching the device at the ends. The attachment means may be an attached hook, or the attachment means may be an enclosed opening on the ends with a hook that may be attached or detachable. Such elastic fastening devices

are of various lengths to accommodate restraining materials of different sizes or quantities, and they are reusable, so it is desirable to store them between uses.

## **DESCRIPTON OF RELATED ART**

[0005] The use of storage apparatus for fastening devices is known in the prior art. A characteristic of fastening devices is the flexibility of the device provides a tendency, when not in use and stored with similar devices, to become a tangled mass. Such a tangled mass takes time to remove an individual fastener from the mass when desired to use it. Also it is difficult to determine the length of a particular fastener when in the tangled state.

[0006] Examples of prior art storage apparatus are U.S. Patent 5,845,787 (Odunnavant, Jr.) and U.S. Patent 6,099,060 (Towers). These storage apparatus make use of the fasteners attached to the ends of the fastening devices to maintain the fastener in a fixed position. U.S. Patent 5,845,787 (Odunnavant, Jr.) attaches the fasteners in a U-shaped configuration on both sides of the center of a linear plane array using round dowel-like members on either side of a brace. The dowels and brace are fastened to support sides such that the configuration requires access to both sides of the linear plane array of fasteners to at-

tach and disengage the storage device fastener. Also it is difficult to determine the length of a fastener attached to the apparatus, as the entire fastener is not visible in a single view. U.S. Patent 6,099,060 (Towers) provides a linear plane array with multiple attachment cross arms intended to allow arranging the fasteners on one side or the other of the apparatus. This array however adds additional length to the apparatus. Both these apparatus require considerable storage room to accommodate the linear plane array of fasteners.

[0007] It is often desirable to store a set of fastening devices of various lengths in a portable manner for use in projects in the field, or projects in multiple locations. Storage in a truck bed, van interior, or hanging from the rack of a pickup truck or van interior is therefore desirable. The prior art takes up considerable space for such storage. What is needed is a compact storage apparatus for such use that provides ease of identifying the fastener length and provides ready access for installing or removing a fastener.

## **SUMMARY OF INVENTION**

[0008] The present invention is a carousel storage apparatus for fastening devices. The fastening devices are stored on a

cylindrical bungee tube exterior surface with multiple attachment openings arranged through the tube from the exterior to the interior surface. The bungee carousel takes advantage of the fastening devices elasticity to maintain the devices on the carousel. The cylindrical configuration provides a compact storage arrangement that may be rotated by hand for inspecting the fastening devices, and is convenient for installing or removing a fastening device.

[0009] The bungee tube attachment openings are arranged such that many fastening devices of varying lengths may be removably installed on the bungee tube between the attachment openings, and other fastening devices may be removably installed between an attachment opening and a bungee tube end opening.

[0010] The bungee tube may incorporate an axle upon which the bungee tube is mounted. The tube is attached to, or incorporates, one or more axle brackets, and a tubular axle is arranged through an opening in the axle brackets forming a bearing surface. The bearing surface is sized such that the bungee tube may be rotated about the tubular axle. Two axle bracket spacers are arranged at each end around the tubular axle between the axle bracket and an axle cap fastened to the tubular axle. The axle bracket

spacers maintain axial alignment of the bungee tube with the axle. The axle caps may have a hanger for hanging the storage apparatus by the axle cap, or the storage apparatus may be vertically mounted in a stand.

### **OBJECTS AND ADVANTAGES**

- [0011] One object of this invention is to provide a compact storage apparatus for fastening devices.
- [0012] A second object of this invention is to provide a storage apparatus for fastening devices that provides easy visual inspection of the fastening devices.
- [0013] A third object of this invention is to provide a storage apparatus for fastening devices that provides ease of installation and removal of the fastening device.
- [0014] A fourth object of this invention is to provide a storage apparatus for fastening devices that is economical to manufacture.

### **BRIEF DESCRIPTION OF DRAWINGS**

- [0015] A more complete understanding of the present invention can be obtained by considering the detailed description in conjunction with the accompanying drawings, in which:
- [0016] Figure 1 is a side view of a bungee carousel mounted on an axle showing in hidden lines the interior structure for

the axle.

[0017] Figure 2 is a perspective view of a bungee carousel mounted on an axle showing fastening devices of various lengths, drawn in dashed lines, installed on the carousel.

[0018] Figure 3 is a perspective view of a bungee carousel mounted on an axle with a view into the interior of one end.

[0019] Figure 4 is an exploded view of a bungee carousel with an axle mounting. A representative fastening device is shown, drawn in dashed lines.

[0020] Figure 5 is a side view of a bungee carousel mounted vertically on an axle showing fastening devices of various lengths, drawn in dashed lines, installed on the carousel.

[0021] Figure 6 is a perspective view of a bungee carousel bungee tube with no mounting in an embodiment with notched attachment openings showing fastening devices of various lengths, drawn in dashed lines, installed on the carousel.

[0022] Figure 7 is a perspective view of a bungee carousel bungee tube with no mounting in an embodiment with small attachment openings showing fastening devices of various lengths, drawn in dashed lines, installed on the carousel.

**[0023] Reference Numerals in Drawings**

**[0024] These reference numbers are used in the drawing to refer to areas or features of the invention.**

**[0025] 50 Tubular axle.**

**[0026] 60 Axle bracket spacer**

**[0027] 70 Axle cap**

**[0028] 72 Axle cap closed end**

**[0029] 74 Axle cap support end**

**[0030] 80 Axle bracket**

**[0031] 82 Axle bracket attachment fastener**

**[0032] 84 Axle bracket interior side**

**[0033] 86 Axle bracket external side**

**[0034] 88 Axle bracket bearing surface**

**[0035] 90 Bungee tube**

**[0036] 92 Bungee tube exterior surface**

**[0037] 94 Bungee tube end opening**

**[0038] 96 Bungee tube attachment opening**

**[0039] 98 Bungee tube end opening notch**

[0040] 100 Bungee tube attachment opening notch

[0041] 120 Vertical mounting stand

## **DETAILED DESCRIPTION**

[0042] The bungee carousel is a compact storage apparatus for elastic fastening devices as shown in figures 1 through 7. Typically such elastic fastening devices have means for attaching the device at the ends. The attachment means may be an attached hook, such as is shown in figures 2, 4, and 5, or the attachment means may be an enclosed opening on the ends with a hook that may be attached or detachable. Such elastic fastening devices are made in various lengths to accommodate restraining materials of different sizes or quantities, and they are reusable, so it is desirable to store them between uses. Figures 2 and 5 show the storage of fastening devices of differing lengths. The storage takes advantage of the elastic nature of the fastening device by stretching it to engage the hooks on the bungee carousel, leaving the fastening device in a slightly tensioned condition, and allowing removal of the fastener by again stretching the fastening device to remove the hooks from the bungee carousel.

[0043] The fastening device storage is on a bungee tube (90) as



shown in figures 1, 2, 5, 6, and 7. The fastening devices are attached to the bungee tube by attaching their hooks to the bungee tube end openings (94), by attaching their hooks to one bungee tube end opening (94) and a bungee tube attachment opening (96), or by attaching their hooks to two bungee tube attachment openings (96). These storage options are available at multiple locations around the circumference of the bungee tube exterior surface (92) as shown in figure 2.

[0044] The bungee tube may be rotated by turning the tube by hand in order to make the entire circumference of the tube visible and accessible. The rotation of the bungee tube alternately may be on an axis determined by an axle (50) positioned within the bungee tube opening (94) by two or more axle brackets (80) located in, and attached to, the bungee tube as shown in figure 1. The axle brackets are attached to the bungee tube by fasteners (82), such as indicated in figure 4, or may be formed integral with the tube. The axle is positioned within the axle bracket bearing surface (88) as shown in figures 1 and 4. This positioning allows rotation of the bungee tube and attached axle bracket around the axis of the axle.

[0045] The alignment of the axle within the length of the bungee

tube is set by axle bracket spacers (60) that slip over the axles (50). The axle bracket spacers (60) are sized to bear on the axle bracket external surface (86) and not enter the axle bracket bearing surface (88). The axle bracket spacers (60) slip over the axle and bear upon the axle bracket external side (86). Alternately they may be formed integral with the axle brackets. Two axle caps (70) are inserted over the axles at the attachment ends (74) and are fastened to the ends of the axle after installation of the axle bracket spacers (60). This retains the spacers and sets the location of the axle within the length of the bungee tube. The axle caps may have means for hanging the apparatus on the axle cap closed end (72) as shown in figures 1, 2, 3, and 4. Alternately it may be mounted in a stand (120) as shown in figure 5 to accommodate the user's available storage space.

[0046] The apparatus is made of various readily available piping or other tubular products, and common attachments or accessories for tubular products. Some parts may be custom manufactured to effect lower costs or desired appearance enhancements, such as colors other than white, gray, or black. The bungee carousel is economically manufactured by selecting a length for the bungee tube to ac-

commodate the longest elastic fastening devices to be installed on the apparatus, and forming multiple attachment openings to accommodate the various lengths of shorter elastic fastening devices. If desired to mount the bungee carousel, the axle brackets are then installed internal to the bungee tube, and an axle of the proper length is installed within the axle bracket bearing surfaces. The axle length is selected based on the length of the axle bungee tube and allowing for extension beyond the tube for installation of the axle bracket spacers and axle caps. The axle bracket spacer length is selected based on the position of the axle bracket spacers within the bungee tube. Axle caps are then installed on both ends of the axle, or alternately if a stand is to be used the stand is attached to one end of the axle. The apparatus may then be supported and positioned horizontally by hanging it from the axle caps or alternately supported and positioned vertically by the stand.

#### **ALTERNATE EMBODIMENTS**

[0047] One embodiment of the bungee carousel is to provide bungee tube end opening notches (98) as shown on the figures. These notches retard motion of the elastic fastening devices around the circumference of the bungee tube

to maintain the devices in a more orderly storage configuration.

[0048] A second embodiment of the bungee carousel is to provide attachment opening notches (100) as shown on figure 6. These notches retard motion of the elastic fastening devices around the circumference of the bungee tube to maintain the devices in a more orderly storage configuration.

[0049] A third embodiment of the bungee carousel is to reduce the size of the attachment openings. This accommodates a larger variety of elastic fastening device lengths and also assists in maintaining the devices in an orderly storage configuration.

[0050] A fourth embodiment of the bungee carousel is to attach the stand to a vertical surface such that the stand supports and positions the bungee carousel in a horizontal position.

## **OPERATION**

[0051] Elastic fastening devices are stored and retrieved using the bungee carousel by rotating the bungee tube such that an attachment opening is in view that is arranged so the elastic fastening device of interest may be stretched in locations between two attachment openings, or between

an attachment opening and a bungee tube end, or between the bungee tube ends. Then the fastening device attachment hoods are attached to the bungee tube in the desired location. This is repeated for each elastic fastening device desired to be stored on the apparatus. The stored elastic fastening devices are then in a compact and visible storage configuration.

[0052] Retrieval of a desired elastic fastening device is by rotating the bungee tube to inspect the lengths of the fastening devices, and selecting a desired fastening device length. The desired elastic fastening device is stretched to disengage the fastening device from the bungee tube.